

WHAT IS CLAIMED IS:

1. A system for recovering carbon dioxide in an exhaust gas, comprising:

5 an absorption device which is provided with an exhaust gas introduction port, an alkaline solution introduction port, a remaining exhaust gas discharge port and an alkaline solution discharge port and causes gas-liquid contact between an exhaust gas introduced from the exhaust gas introduction port and an  
10 alkaline solution introduced from the alkaline solution introduction port to absorb carbon dioxide contained in the exhaust gas by the alkaline solution;

a regeneration device which is provided with an alkaline solution spurt port, a regenerated alkaline solution discharge  
15 port and a carbon dioxide discharge port and discharges carbon dioxide from the alkaline solution having absorbed the carbon dioxide to regenerate the alkaline solution;

a first alkaline solution reflux line which refluxes the alkaline solution being discharged from the alkaline solution  
20 discharge port of the absorption device to the alkaline solution introduction port;

a second alkaline solution reflux line which refluxes the regenerated alkaline solution being discharged from the regenerated alkaline solution discharge port of the regeneration  
25 device to the alkaline solution spurt port; and

a storage tank which is comprised of a plurality of split tanks capable of intervening in either the first alkaline solution reflux line or the second alkaline solution reflux line by switching

the alkaline solution reflux lines.

2. The system for recovering carbon dioxide in an exhaust gas according to claim 1, wherein a main solute of the alkaline solution is sodium carbonate, potassium carbonate or amine.

5 3. A method for recovering carbon dioxide in an exhaust gas, comprising:

a first absorption step which refluxes a first alkaline solution being discharged from an alkaline solution discharge port of an absorption device to an alkaline solution introduction port  
10 of the absorption device through a first split tank among a plurality of split tanks configuring a storage tank to cause gas-liquid contact between the exhaust gas and the first alkaline solution to repeatedly absorb carbon dioxide contained in the exhaust gas by the first alkaline solution; and

15 a first regeneration step which switches a reflux line of the first alkaline solution to introduce the first alkaline solution having absorbed the carbon dioxide in the first absorption step to an alkaline solution spurt port of a regeneration device, refluxes the first alkaline solution being discharged from a  
20 regenerated alkaline solution discharge port of the regeneration device to the alkaline solution spurt port through the first split tank, and discharges repeatedly the carbon dioxide into the regeneration device to regenerate the carbon dioxide absorption capacity of the first alkaline solution.

25 4. The method for recovering carbon dioxide in an exhaust gas according to claim 3, further comprising:

a second absorption step which guides a second alkaline solution stored in a second split tank of the storage tank to the

alkaline solution introduction port of the absorption device when the first regeneration step is being performed, refluxes the second alkaline solution being discharged from the alkaline solution discharge port of the absorption device to the alkaline solution introduction port through the second split tank and causes gas-liquid contact between the exhaust gas and the second alkaline solution to repeatedly absorb the carbon dioxide contained in the exhaust gas by the second alkaline solution.

5     5.     The method for recovering carbon dioxide in an exhaust gas according to claim 4, further comprising:

10         a second regeneration step which switches the reflux line of the alkaline solution to introduce the second alkaline solution having absorbed the carbon dioxide in the second absorption step to the alkaline solution spurt port of the regeneration device, refluxes the second alkaline solution being discharged from the regenerated alkaline solution discharge port of the regeneration device to the alkaline solution spurt port through the second split tank, and discharges repeatedly the carbon dioxide into the regeneration device to regenerate the carbon dioxide absorption capacity of the second alkaline solution; and

20         a third absorption step which switches a reflux line at the same time when the reflux line is switched in the second regeneration step, guides the first alkaline solution regenerated in the first regeneration step to the alkaline solution introduction port of the absorption device, refluxes the first alkaline solution being discharged from the alkaline solution discharge port of the absorption device to the alkaline solution introduction port through the first split tank, and causes gas-liquid contact between

the exhaust gas and the first alkaline solution to repeatedly absorb the carbon dioxide contained in the exhaust gas by the first alkaline solution.

6. A system for recovering carbon dioxide in an exhaust gas, comprising:

an absorption device which is provided with an exhaust gas introduction port, an alkaline solution introduction port, a remaining exhaust gas discharge port and an alkaline solution discharge port, and causes gas-liquid contact between the introduced exhaust gas and an alkaline solution to absorb carbon dioxide contained in the exhaust gas by the alkaline solution to produce a reaction product insoluble compound;

an alkaline solution reflux line which refluxes the alkaline solution being discharged from the alkaline solution discharge port of the absorption device to the alkaline solution introduction port; and

a collection tank which is intervened in the alkaline solution reflux line or connected by a pipe branched from the alkaline solution reflux line to collect an insoluble compound contained in the alkaline solution.

7. The system for recovering carbon dioxide in an exhaust gas according to claim 6, wherein the alkaline solution is produced by dissolving sodium carbonate into water, and the sodium carbonate dissolved in the alkaline solution has a weight concentration of 9 to 22%.

8. The system for recovering carbon dioxide in an exhaust gas according to claim 6, further comprising:

a regeneration device to which the insoluble compound is

supplied and which heats the insoluble compound to discharge carbon dioxide, thereby regenerating an alkali material, which configures the alkaline solution, from the insoluble compound.

5 9. A method for recovering carbon dioxide in an exhaust gas, comprising:

an absorption step which causes gas-liquid contact between the exhaust gas and an alkaline solution and absorbs the carbon dioxide contained in the exhaust gas by the alkaline solution to generate a reaction product insoluble compound;

10 a circulation step which causes repeatedly gas-liquid contact between the alkaline solution and the exhaust gas; and

a collection step which collects the insoluble compound contained in the alkaline solution.

15 10. The method for recovering carbon dioxide in an exhaust gas according to claim 9, further comprising:

a regeneration step which heats the insoluble compound collected in the collection step to discharge the carbon dioxide and regenerates an alkali material, which configures the alkaline solution, from the insoluble compound.

20 11. The method for recovering carbon dioxide in an exhaust gas according to claim 10, wherein the absorption step, the collection step, the circulation step and the regeneration step are repeated sequentially.